TABLE II.

Number of observations without any visible ozone.

Month.	During the night.		During the day.	
	Twelve hours' exposure.	Twenty-four hours' exposure.	Twelve hours' exposure.	Twenty-four hours' exposure.
1859. May.........	9	4	19	12
June.........	18	10	15	9
July.........	18	12	18	13
August......	10	4	15	9
September..	2	0	0	0
October ...	16	12	18	14
November..	10	7	10	10
December...	10	5	7	5
1860. January ...	8	6	7	5
February ...	12	6	9	9
March	0	0	0	0
Number of days...	113	66	118	86

Mean amount of ozone with the box suspended at the height of 25 feet.

1859.	December 24 hours' exposure $=3\cdot0$	48 hours' exposure $=5\cdot0$
1860.	January... 24 hours' exposure $=3\cdot9$	48 hours' exposure $=4\cdot5$
	February 24 hours' exposure $=3\cdot7$	48 hours' exposure $=5\cdot4$
	March ... 24 hours' exposure $=5\cdot9$	48 hours' exposure $=6\cdot4$

Mean amount of ozone with the box suspended at the height of 40 feet, March 1860, with twenty-four hours' exposure $=7\cdot1$.

X. "On the Temperature of the Flowers and Leaves of Plants." By E. J. LOWE, Esq., F.R.A.S., F.L.S. &c. Communicated by THOMAS BELL, Esq., P.L.S., V.P.R.S. &c. Received April 16, 1860.

(Abstract.)

The present observations were made in order to ascertain whether different plants and flowers influence the temperature of the air immediately over them. The author was induced to undertake the inquiry from what he had noticed whilst making observations on the fall-cloud, or white mist of the valley, as it is usually called.

In the autumn of 1858 it was repeatedly noticed that vapour formed first over those fields from which hay had been gathered in the summer, and which were covered with a good crop of *after-math*.

The mists then gradually formed over the shorter grass of the pasture fields, yet, unless when the fog was very thick, it never formed over stubble fields (*i. e.* where corn had grown). It was further observed, that at times when undrained or imperfectly-drained ploughed fields had this mist, those that were better drained were free from vapour; moreover, the furrows or low places of a field were the spots on which fogs first formed.

Hedges, on the contrary, seem to have a repulsive influence on fogs; the author has seen a field in which the mist rose higher than the hedges, but did not flow over or even touch them, but at length poured out through the gateway in a long dense column.

These peculiarities seemed to be owing either to the different temperatures of different trees and vegetables, or of the soils on which they grew, or perhaps to both. To determine this, the author has tested as carefully as possible the temperature of various flowers in comparison with that of grass, as well as that of different soils; imitating artificially the conditions of drained and undrained fields, so that the observations might be made close together, and therefore better comparable with each other. In this latter series, which is not yet completed, and does not form part of the present paper, daily records are made of the greatest heat and cold on the surface of soils, sand, gravel, clay, &c., as well as above the ground, and from 2 to 8 inches below the surface.

The thermometers employed were constructed by Messrs. Negretti and Zambra; they are self-registering, and entirely of glass; the degrees being engraved on the tube, and rendered more distinctly visible by means of enamel at the back. Some of the instruments are of very small size, in order that they may be placed within the tubes of certain flowers.

All the observations were carried on by myself at the Beeston Observatory.

At first the thermometers were placed over the growing plant, and afterwards the flowers and leaves were arranged in bottles of water, and either exposed to full sunshine, or placed in the shade, the bottles being sunk in the ground to the level of the grass, filled with a bunch of flowers, and the thermometers placed immediately over them.

With regard to the readings on the grass and on the common

Daisy (*Bellis perennis*), it should be mentioned that a portion of the grass was selected where a large group of daisies were fully in bloom, and within a foot of this another space where every daisy was carefully cut off from a circle of 12 inches, in the centre of which a second thermometer was placed on the grass, so that these records are very conclusive as regards the growing plant.

Bearing upon this subject, it is proper to state, from a series of experiments with thermometers placed in full sunshine on the grass, and at 4 feet above the grass, that in winter the temperature on the grass is always lower than at 4 feet, whilst in summer the reverse takes place, the thermometers reading almost alike for a short time in spring and autumn. To this circumstance may be attributed the less striking results in hot weather, especially where the difference between the grass and a flower is only from 1° to 2°.

Tables stating the details of the observations, which extended from February 26 to September 19, 1859, and from the 22nd to the 27th of March, 1860, are given in the paper. The author subjoins the following as the principal results :—

Great differences occur from time to time in the temperature of plants, and much depends upon the meteorology of the day, the differences being usually greater with a cloudless sky than with one which is loaded with cloud. The time of day seems also to operate on some plants to a great degree; as an instance, the *Erica herbacea*, which between 1 and 2 P.M. had shown a warmth of above 5° over that of the grass, by 3 o'clock was only 1° warmer, and by 4 o'clock was colder than the grass.

In the majority of instances grass is colder than flowers, as shown by the following examples :—

1. Eleven observations on *Daphne cneorum* in comparison with grass.

The mean gives *Daphne cneorum* 1°·2 warmer than grass. The temperatures range between 41° and 73°·3. In nine cases the temperature was warmest over *Daphne cneorum*, the greatest difference being 3°·7.

2. Thirty-nine observations on *Gentiana acaulis* in comparison with grass.

The mean gives *Gentiana acaulis* 2° warmer than grass. The temperatures range between 41° and 89°·8. In thirty-four cases the

temperature was warmest over *Gentiana acaulis*, the greatest difference being 7°·9.

3. Eight observations on *Iberis sempervirens* in comparison with grass.

The mean gives *Iberis sempervirens* 2°·3 warmer than grass. The temperatures range between 41° and 63°·2. In seven cases the temperature was warmest over *Iberis sempervirens*, the greatest difference being 3°·1.

4. Ten observations on *Alyssum tortuosum* in comparison with grass.

The mean gives *Alyssum tortuosum* 2°·3 warmer than grass. The temperatures range between 41° and 88°·9; in every case being warmer than grass, the greatest difference being 3°·7.

5. Eleven observations of a white Daisy in comparison with grass.

The mean gives the Daisy 0°·2 hotter than grass; the range of temperature from 40°·3 to 80°·5. Greatest difference 4°·4.

6. Seven observations of *Veronica alpina* in comparison with grass.

The mean gives *Veronica alpina* 1°·9 warmer than grass; the temperature ranging from 42°·8 to 65°·5. In no instance was it lower than grass. Greatest difference 5°·0.

7. Seven observations of *Alyssum tortuosum* in comparison with *Reseda frutescens*.

The mean gives *Alyssum tortuosum* 2°·4 hotter than *Reseda frutescens*.

8. Thirty-three observations of *Tulipa Gesneriana* in comparison with grass.

The mean gives *Tulipa Gesneriana* 1°·9 hotter than grass; the temperature ranging between 31°·4 and 96°·5. In twenty-five instances it was warmer than grass. Greatest difference 12°·8.

9. Twenty-eight observations of *Eschscholtzia crocea* in comparison with grass.

The mean gives the *Eschscholtzia* 3°·6 warmer than grass; the temperature ranging between 37° and 102°·3. In twenty-four instances it was warmer than the grass. Greatest difference with black bulb 15°·7.

10. Ten observations of *Lilium concolor* in comparison with grass.

The mean gives *Lilium concolor* 2°·9 warmer than grass; the

temperature ranging between 64° and 85°·7. In every instance it was warmer, the greatest difference being 6°·6.

11. Eleven observations of *Valeriana tuberosa* in comparison with grass.

The mean gives the Valerian 0°·5 warmer than grass; the temperature ranging between 52°·6 and 73°. In seven instances it was warmer than the grass, the greatest difference being 3°·3.

[In the last four examples the temperature at night, and the maximum with black bulb are included, so that the former will tend to lower the result and the latter to raise it.]

XI. "Reduction and Discussion of the Deviations of the Compass observed on board of all the Iron-built Ships and a selection of the Wood-built Steam-ships in Her Majesty's Navy, and the Iron Steam-ship 'Great Eastern';" being a Report to the Hydrographer of the Admiralty. By FREDERICK J. EVANS, Esq. Communicated by the Lords Commissioners of the Admiralty. Received May 5, 1860.

(Abstract.)

The analysis of the deviations of the compass in this paper comprises the observations made in forty-two iron ships, varying in size from 3400 to 165 tons, a selection of wood-built screw and paddle-wheel steam-vessels, as also the steam-ship 'Great Eastern' at various times prior to her departure from England.

The observations made in the iron-built ships extend over periods varying between thirteen and five years; and having been made with the same description of compass—the Admiralty standard—and under similar conditions of arrangement and situation, in accordance with the system carried out in Her Majesty's Navy, details of which are given, the general results are strictly comparable.

In the analysis of the Tables, amounting to nearly 250 in number, of deviations observed in various parts of both hemispheres, the formula deduced from Poisson's General Equations by Mr. Archibald Smith, given in the Philosophical Transactions for 1846, p. 348, has been employed.

In this formula, the deviation of the compass on board ship,